

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
21 October 2004 (21.10.2004)

PCT

(10) International Publication Number  
**WO 2004/089283 A3**

(51) International Patent Classification<sup>7</sup>: **A61K 45/00**,  
47/00, 48/00, 49/10, 38/21

(21) International Application Number:  
PCT/US2004/010049

(22) International Filing Date: 31 March 2004 (31.03.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/460,194 4 April 2003 (04.04.2003) US

(71) Applicant (for all designated States except US): **INTER-  
MUNE, INC.** [US/US]; 3280 Bayshore Boulevard, Bris-  
bane, CA 94005 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **BLATT, Lawrence,**  
M. [US/US]; 10 Shoreview, San Francisco, CA 94121  
(US).

(74) Agent: **BORDEN, Paula, A.**; Bozicevic, Field & Francis  
LLP, 1900 University Avenue, Suite 200, East Palo Alto,  
CA 94303 (US).

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Euro-  
pean (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,  
GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,  
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,  
ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report
- before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments

(88) Date of publication of the international search report:  
4 August 2005

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: COMPOSITIONS AND METHODS FOR TREATING VIRAL INFECTIONS

(57) Abstract: The present invention provides methods of treating a virus infection, and methods of reducing viral load, or reduc-  
ing the time to viral clearance, or reducing morbidity or mortality in the clinical outcomes, in patients suffering from a coronavirus  
infection. The present invention further provides methods of reducing the risk that an individual will develop a pathological virus  
infection, that has clinical sequelae. The methods generally involve administering a therapeutically effective amount of a Type I or  
Type III interferon receptor agonist and a Type II interferon receptor agonist for the treatment of a virus infection, and co-administer-  
ing an amount of an additional non-pirfenidone/pirfenidone analog agent effective to reduce or eliminate the occurrence or severity  
of side effects normally associated with the administration of the interferon receptor agonists.

WO 2004/089283 A3

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/10049

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61K 45/00, 47/00, 48/00, 49/10, 38/21

US CL : 424/93.1, 85.4, 85.5, 85.6, 85.7; 514/44, 45, 46, 49, 50

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 424/93.1, 85.4, 85.5, 85.6, 85.7; 514/44, 45, 46, 49, 50

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CARCIA. L. Pirfenidone effectively reverse experiment liver fibrosis. Journal of Hepatology. December 2002, pages 797-805, see pages 797, Figs. 3-5.	1-7
A	HONG. J.H. Current Status of Anti-HBV Chemotherapy, Arc. Phar. Res. April, 1998, V/ol. 21. No. 2, pages 89-105, see entire document.	1-7
Y	DUCHEIKO. G. Side Effects of Alpha Interferon in Chronic Hepatitis C. HEPATOLOGY, October, 1997, Vol. 26 (Suppl. 1), pages 112S-121S, see pages 112S and 1117S.	1-7
A		8-13
Y	WO 94/26249A1 (MARGOLIN. S.) November 24, 1994 (24.11, 94), claims 1-22.	1-7
Y	SHINICHI et al. Current Therapy for Chronic Viral Hepatitis and Its Future. 1999, Vol. 36. No. 2, see entire document by the translated version.	1-7
Y	SCHUPPAN. D. et al. Hepatitis C and liver fibrosis, Cell Death and Differentiation. January 2003, Vol. 10, pages S59-67, see pages 59-60, especially Fig. 1.	1-7

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"B" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

27 April 2005 (27.04.2005)

Date of mailing of the international search report

08 JUN 2005

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Bao Qun Li

Telephone No. 571-272-1600

**INTERNATIONAL SEARCH REPORT**

International application No.  
PCT/US04/10049

Continuation of B. FIELDS SEARCHED Item 3:

STN: CAPLUS, BIOSIS, MEDLINE

Search terms: Interferon, virus infection, HBV, HCV, pirofenidone, pirfenidone, analog, nucleoside, fibrosis